# VIRULENCE FACTORS AND ANTIMICROBIAL RESISTANCE PATTERN OF BACTERIAL ISOLATES FROM READY-TO-EAT WATERMELONS AND PINEAPPLES IN OTA

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**(19PCQ02046)**

**September 2021**

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**By**

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**A DISSERTATION SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF SCIENCE (M.Sc) DEGREE IN MICROBIOLOGY IN THE DEPARTMENT OF BIOLOGICAL SCIENCES, COLLEGE OF SCIENCE AND TECHNOOGY, COVENANT UNIVERSITY**

**SUPERVISOR: PROF. GRACE I. OLASEHINDE**

**September 2021**

## ACCEPTANCE

This is to attest that this dissertation is accepted in partial fulfillment of the requirements for the award of the degree of Master of Science in Microbiology in the Department of Biological Sciences, College of Science and Technology, Covenant University, Ota, Nigeria.

**Mr. John A. Philip** ……

(Secretary, School of Postgraduate Studies) Signature and Date

**Prof. Akan B. Williams** …….

(Dean, School of Postgraduate Studies) Signature and Date

## DECLARATION

I, **FASUYI, NIFEMI OLAMIDE** (19PCQ02046) declare that this research was carried out by me under the supervision of Prof. Grace I. Olasehinde of the Department of Biological Sciences, College of Science and Technology, Covenant University, Ota, Nigeria. I attest that this dissertation has not been presented either wholly or partially for the award of any degree elsewhere. All sources of data and scholarly information used in this dissertation are duly acknowledged.

……..

**FASUYI, NIFEMI OLAMIDE** Signature and Date

## CERTIFICATION

We certify that this dissertation titled "Virulence factors and antimicrobial resistance pattern of bacterial isolates from ready-to-eat watermelons and pineapples in Ota" is an original research work carried out by **FASUYI, NIFEMI OLAMIDE (19PCQ02046)** in the department of Biological Sciences, College of Science and Technology, Covenant University, Ota, Ogun state, Nigeria under the supervision of Prof. Grace I. Olasehinde. We have examined and found this work acceptable as part of the requirements for the award of Master of Science (M.Sc) degree in Microbiology.

**Prof. Grace I. Olasehinde** 

**(Supervisor)** **Signature and Date**

**Prof. Solomon U. Oranusi** ……

**(Head of Department)** **Signature and Date**

**Prof. Rebecca Afolabi** ……

**(External Examiner)** **Signature and Date**

**Prof. Akan B. Williams** ……

**(Dean, School of Postgraduate Studies)** **Signature and Date**

## DEDICATION

To Ayotomi and Akinyemi

**ACKNOWLEDGEMENTS**

Dear God, thank you for starting with me and finishing with me. Thank you for showing up during bleak moments and proving yourself faithful over and over again.

I am grateful to my supervisor, Prof. Grace I. Olasehinde, for her nurturing patience and guidance, and for always bringing opportunities of career development to my attention. I learnt a lot from you.

My gratitude to the resourceful personnel in the Department of Biological Sciences, Dr. Margaret Oniha for her passionate interest in my work, Dr. Frank Eze for dedicating his time to coach me in the writing of this dissertation, Dr. Jacob Popoola for his timely intervention and contributions, Mrs. Oshamika for her ever friendly and encouraging spirit, Dr. Paul Akinduti and Dr. Yemisi Obafemi for making the time out of their busy schedules to attend to my questions, Mr. Olugbenga Taiwo for always offering suggestions that never fail to work, checking on me, and sharing his food and jokes with me, and Mr. Mike Olawale for tirelessly attending to the research materials I needed.

Twitter, Sci-hub, Dr. Olumuyiwa Igbalajobi, Dr. Zoe Ayres helped make the long months in the laboratory easier. Sci-hub made accessible full research papers that would have been otherwise difficult to obtain. I met Dr. Igbalajobi and Dr. Ayres on Twitter. These two pillars in the academic community opened my eyes to truths of the profession that would have taken me decades to realize. Dr. Ayres revealed to me the importance of work-life balance with especial reference to mental health such that I too have become an advocate. #AcademicTwitter is deeply appreciated for the free knowledge, jokes and memes that show that no one is lonely on the path to academic success. I had many relieving laughs.

My parents, Mr. and Mrs. Fasuyi, who have solidly stood by me these past years, steadfastly praying and supporting me through this tasking academic pursuit, I appreciate your presence, dedication, and sacrifice to give me the best you can afford and beyond. Akinbayonle and Ayonitemi, thanks for understanding my absence away from home year after year. It's all so I can be a better big sister.

My esteemed colleagues, Dozie, Dominion, Bolu, Bimbo, and Anne, are appreciated for always encouraging and helping when they could. Thank you Ayomide, for your assistance. I couldn't have asked for a better team mate.

It would have been tougher without the love of Busayo who frequently checked on me, Deborah and Joan who opened the doors of their shops for me to have some rest each workday like the Shunamite woman, Oluwaseyi for our sweet friendship, Lateef for showing up in the nick of time, Mimi for being a rock when my health failed, Nathan for caring so deeply about my wellbeing, and Eyitayo for loving me.

Finally, I appreciate myself for not throwing in the towel when I would have, and emerging the better for it.

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**ABSTRACT**

Ready-to-eat (RTE) fruits are increasingly found in the markets as consumers demand fresh fruits on-the-go to meet up with a fast-paced lifestyle. Despite their advantages, the fruits are exposed to contamination due to the many processes they go through before they reach the consumer. This creates conditions for pathogens to establish themselves on the surface and within the pulp of fruits which may lead to illnesses on consumption. The aim of this study was to examine retailed RTE fruits in Ota for bacterial contaminants, highlight their antibiotic susceptibility patterns and detect selected virulence factors. RTE watermelons and pineapples were sampled from vendors along strategic locations in Ota, Ogun State. The fruits were analyzed using standard microbiological methods. Presumptive identification was by biochemical tests, Kirby-Bauer disc diffusion method was used to determine their resistance patterns against eight antibiotics. The isolates were screened for haemolytic activity, protease activity, and biofilm formation. Molecular characterization was carried out using polymerase chain reaction. The 16SrRNA gene of the isolates was amplified using the primer pair 27F-5′- AGAGTTTGATCCTGGCT CAG -3', and 1492R 5'- GGTTACCTTGTTACGACTT -3'. to confirm isolates. The isolates were tested against eight antibiotics for their susceptibility and screened for haemolytic activity, protease activity, and biofilm formation. The isolates identified via Gram-staining and biochemical tests were *Bacillus, Listeria, Sarcina, Pseudomonas, Lactobacillus, Micrococcus, Staphylococcus,* and *Streptococcus* species. *Bacillus* sp. was detected in both pineapples and watermelons. The most active antibiotics with their susceptibility rates were Ofloxacin (88%), Gentamicin (77%), and Erythromycin (33%). A 100% resistance to Ceftazidime, Cefuroxime, Cloxacillin, Nitrofurantoin, and Cefixime was observed. *Staphylococcus* was resistant to all the antibiotics. The isolates possessed at least one virulence factor. Of the isolates, 38.9% were negative for biofilm formation, 50% were proteolytic, and 61.1% showed either beta or alpha haemolysis. Bacteria with diverse pathogenic factors are present in RTE fruits. It is recommended that actions which will reduce the bacterial load on RTE fruits are enforced.

Keywords: Bacterial pathogens, Watermelon, Pineapple, Antibiotic susceptibility, Virulence factors, Protease, Biofilm formation, Haemolysis